

The Status of the Claims

1. (Currently amended) A method of executing a non-native software instruction, the method comprising:

receiving the non-native software instruction at a device;

directly compiling the non-native software instruction to generate a first native software instruction from a first instruction set at the device;

executing the first native software instruction at the device;

determining a current frequency of execution associated with the first native software instruction by incrementing a counter in response to the execution of the first native software instruction, wherein the current frequency of execution is determined a plurality of times during execution of one or more programs associated with the first native software instruction;

when the current frequency of execution associated with the first native software instruction exceeds a threshold during the execution of the one or more programs associated with the first native software instruction, directly compiling the non-native software instruction to generate a second native software instruction from a second instruction set at the device, wherein the second instruction set is different from the first instruction set; and

executing the second native software instruction at the device.

2. (Canceled)

3. (Previously Presented) A method as defined in claim 1, further comprising inserting instrumentation to count a number of times the first native software instruction is

executed.

4. (Previously presented) A method as defined in claim 1, further comprising receiving the threshold via a mobile runtime configuration parameter.

5. (Original) A method as defined in claim 1, wherein receiving the non-native software instruction at the device comprises receiving an intermediate language instruction at the device.

6. (Original) A method as defined in claim 1, wherein receiving the non-native software instruction at the device comprises receiving Java byte code at the device.

7. (Original) A method as defined in claim 1, wherein receiving the non-native software instruction at the device comprises wirelessly receiving the non-native software instruction at a hand-held computing device.

8. (Original) A method as defined in claim 1, wherein the first native software instruction comprises an X-bit wide instruction, the second native software instruction comprises a Y-bit wide instruction, and X is less than Y.

9. (Original) A method as defined in claim 1, wherein the first native software instruction comprises a 16-bit wide instruction, and the second native software instruction

comprises a 32-bit wide instruction.

10. (Original) A method as defined in claim 1, wherein the first native software instruction comprises a Thumb instruction, and the second native software instruction comprises an ARM instruction.

11. (Previously presented) A method as defined in claim 1, wherein compiling the non-native software instruction at the device comprises using a just-in-time compiler.

12. (Original) A method as defined in claim 1, further comprising:
configuring a first code optimization option prior to generation of the first native software instruction, the first code optimization option causing smaller code to be generated;
and
configuring a second code optimization option prior to generation of the second native software instruction, the second code optimization option causing faster code to be generated.

13. (Previously presented) A method as defined in claim 1, wherein compiling the non-native software instruction to generate the first native software instruction comprises generating a first plurality of native software instructions, and compiling the non-native software instruction to generate the second native software instruction comprises generating a second plurality of native software instructions, the method further comprising:

counting a first number of instructions contained within the first plurality of native software instructions;

counting a second number of instructions contained within the second plurality of native software instructions; and

comparing the first number of instructions and the second number of instructions, wherein executing the first native software instruction is in response to one of (i) the second number of instructions equaling the first number of instructions and (ii) the second number of instructions exceeding the first number of instructions.

14. (Original) A method as defined in claim 13, further comprising:

comparing the first number of instructions and the second number of instructions, wherein executing the second native software instruction is in response to the first number of instructions not exceeding the second number of instructions by more than a predetermined threshold.

15. (Original) A method as defined in claim 1, further comprising:
measuring the first native software instruction resulting in a first number of bytes;
measuring the second native software instruction resulting in a second number of
bytes; and
comparing the first number of bytes and the second number of bytes, wherein
executing the first native software instruction is in response to the first number of bytes being
less than the second number of bytes by at least a predetermined threshold.

16. (Original) A method as defined in claim 1, further comprising:
measuring the first native software instruction resulting in a first number of bytes;
measuring the second native software instruction resulting in a second number of
bytes; and
comparing the first number of bytes and the second number of bytes, wherein
executing the second native software instruction is in response to the first number of bytes
not being less than the second number of bytes by at least a predetermined threshold.

17. (Currently amended) An article of manufacture comprising a machine-accessible storage medium having a plurality of machine accessible instructions that, when executed, cause a device to:

receive a non-native software instruction at the device;

directly compile the non-native software instruction to generate a first native software instruction from a first instruction set at the device;

execute the first native software instruction at the device;

determine a current frequency of execution associated with the first native software instruction by incrementing a counter in response to the execution of the first native software instruction, wherein the current frequency of execution is determined a plurality of times during execution of one or more programs associated with the first native software instruction;

when the current frequency of execution associated with the first native software instruction exceeds a threshold during the execution of the one or more programs associated with the first native software instruction, directly compile the non-native software instruction to generate a second native software instruction from a second instruction set at the device, wherein the second instruction set is different from the first instruction set; and

execute the second native software instruction at the device.

18. (Canceled)

19. (Previously Presented) A machine-accessible storage medium as defined in claim 17, wherein the plurality of machine accessible instructions are configured to cause the device to insert instrumentation to count a number of times the first native software instruction is executed.

20. (Previously Presented) A machine-accessible storage medium as defined in claim 16, wherein the non-native software instruction comprises an intermediate language instruction.

21. (Previously Presented) A machine-accessible storage medium as defined in claim 16, wherein the first native software instruction comprises an X-bit wide instruction, the second native software instruction comprises a Y-bit wide instruction, and X is less than Y.

22. (Previously Presented) A machine-accessible storage medium as defined in claim 16, wherein the first native software instruction comprises a Thumb instruction, and the second native software instruction comprises an ARM instruction.

23. (Previously Presented) A machine-accessible storage medium as defined in claim 16, wherein the plurality of machine accessible instructions includes at least a portion of a just-in-time compiler.

24. (Previously Presented) A machine-accessible storage medium as defined in claim 16, wherein the first native software instruction comprises a first plurality of native software instructions, and the second native software instruction comprises a second plurality of native software instructions, wherein the plurality of machine accessible instructions are configured to cause the device to:

count a first number of instructions contained within the first plurality of native software instructions;

count a second number of instructions contained within the second plurality of native software instructions; and

compare the first number of instructions and the second number of instructions, wherein executing the first native software instruction is in response to one of (i) the second number of instructions equaling the first number of instructions and (ii) the second number of instructions exceeding the first number of instructions.

25. (Previously Presented) A machine-accessible storage medium as defined in claim 24, wherein the plurality of machine accessible instructions are structured to cause the device to:

compare the first number of instructions and the second number of instructions, wherein executing the second native software instruction is in response to the first number of instructions exceeding the second number of instructions by more than a predetermined threshold.

26. (Previously Presented) A machine-accessible storage medium as defined in claim 16, wherein the plurality of machine accessible instructions are structured to cause the device to:

measure the first native software instruction resulting in a first number of bytes;

measure the second native software instruction resulting in a second number of bytes;

and

compare the first number of bytes and the second number of bytes, wherein executing the first native software instruction is in response to the first number of bytes being less than the second number of bytes by at least a predetermined threshold.

27. (Previously Presented) A machine-accessible storage medium as defined in claim 16, wherein the plurality of machine accessible instructions are structured to cause the device to:

measure the first native software instruction resulting in a first number of bytes;

measure the second native software instruction resulting in a second number of bytes;

and

compare the first number of bytes and the second number of bytes, wherein executing the second native software instruction is in response to the first number of bytes not being less than the second number of bytes by at least a predetermined threshold.

28. (Currently amended) An apparatus structured to execute a mixed mode code, the apparatus comprising:

a memory device; and

a mixed mode processor operatively coupled to the memory device, the mixed mode processor being structured to execute a runtime environment, the runtime environment being stored in the memory device, the runtime environment comprising:

a compiled binary comprising a plurality of non-native instructions;

a first code generator to compile at least one of the non-native instructions to generate a first native software instruction, the first native software instruction being associated with a first instruction set of the mixed mode processor;

a counter to be incremented in response to the execution of the first native software instruction to determine a current frequency of execution associated with the first native software instruction, wherein the current frequency of execution is determined a plurality of times during execution of one or more programs associated with the first native software instruction;

a second code generator to compile at least one of the non-native instructions to generate a second native software instruction when the current frequency of execution associated with the first native software instruction exceeds a threshold during the execution of the one or more programs associated with the first native software instruction, the second native software instruction being associated with a second instruction set of the mixed mode processor, wherein the first instruction set is different than the second instruction set; and

an executing code including the first instruction and the second instruction.

29. (Original) An apparatus as defined in claim 28, wherein the first instruction set comprises an X-bit wide instruction set, the second instruction set comprises a Y-bit wide instruction set, and X is less than Y.

30. (Original) An apparatus as defined in claim 28, wherein the first instruction set comprises a 16-bit wide instruction set, and the second instruction set comprises a 32-bit wide instruction set.